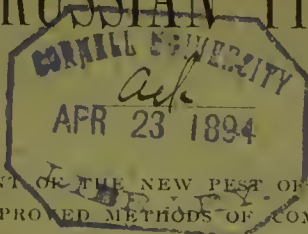


THE RUSSIAN THISTLE.



A BRIEF ACCOUNT OF THE NEW PEST OF THE NORTHWEST,
WITH APPROVED METHODS OF COMBATING IT,
AND CONTAINING THE

REPORT OF THE CACTUS COMMITTEE APPOINTED
BY THE GOVERNOR AT THE LAMOURE
MEETING, NOVEMBER 9, 1893.

PUBLISHED BY

NELSON WILLIAMS,

STATE COMMISSIONER OF AGRICULTURE AND LABOR,
FOR NORTH DAKOTA.

APPROVED: E. C. D. SHORTRIDGE, GOVERNOR.

FARGO, N. D.:
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The Russian Thistle.

Or Russian Cactus.

The ravages of this plant in the southern counties of North Dakota during the last year or two, its still greater havoc for several years in South Dakota, its rapid spread to other territory, and the practical impossibility of the production of the small grain cereals in a district thoroughly infested by the weed, have caused no small alarm among the wheat-raisers of the Northwest. Within the short period of some sixteen or seventeen years from its first introduction into Bon Homme county, now South Dakota, it has crossed that entire State and reached nearly to the Northern Pacific Railway on the north, crossed the Missouri river and spread rapidly in Nebraska until it has infected about one-fourth of that State, while to the eastward it is found in many places in Minnesota, and even in Wisconsin. Owing to the rarity of high winds from the east, the plant has not spread greatly to the west.

During the autumn of 1893 the alarm among the citizens of the southern counties of North Dakota became such that Governor Shortridge was appealed to to call a meeting to consider repressive measures, while other petitions urged a special session of the Legislature to appropriate money to aid the infected counties in exterminating the pest. In compliance with the first-named request, the Governor called a public meeting to be held at LaMoure on November 9, 1893, at which meeting a committee was appointed to make a report to the Commissioner of Agriculture and Labor, giving all available information about the weed, the extent of the infected ter-

ritory, and the most approved methods of combating its further spread and of eradicating it from infected lands.

This committee, after considerable time spent in gathering information, made its report on February 17, 1894, having in the meantime sent through the Governor a memorial to Congress, urging the passage of the Hansbrough bill, which proposes to appropriate money from the National treasury to be expended under the direction of the Secretary of Agriculture in the effort to exterminate the pest.

The report of the Cactus committee to the Commissioner of Agriculture and Labor is as follows :

REPORT OF THE RUSSIAN CACTUS COMMITTEE.

To the Honorable Commissioner of Agriculture and Labor, State of North Dakota :

On the ninth day of November, 1893, a convention of the citizens of North Dakota assembled in the town of LaMoure, by call of Governor Shortridge, for the purpose of obtaining information concerning the spread of a recently introduced weed known as the Russian cactus; and of devising if possible means and methods for its ultimate destruction.

By direction of said convention a committee of five, consisting of Dr. M. F. Merchant, Hon. Lyman R. Casey, Hon. H. S. Oliver, J. M. Devine and Wm. J. Dwyer, was appointed by the Governor, with instructions to collect all the facts and statistics bearing upon the spread of and damage caused by said cactus to the crop of 1893; and further, to ascertain and devise methods which have been found useful or are likely to prove successful in checking and exterminating the plant where now existing in the state; and to make a final report of such information to the State Commissioner of Agriculture and Labor; also, to draft a memorial to Congress soliciting National aid.

The memorial was duly prepared and forwarded to the Governor for his approval and final transmittal to Congress.

In the preparation of this report many delays have been encountered; but I herewith transmit to you such information as we have been able to obtain from responses to inquiries sent out by our secretary, J. M. Devine, to the officials of the several cactus infested counties, together with other material facts obtained from competent observers.

The plant so commonly known as Russian cactus, or Russian thistle, from its foreign origin and spiny nature, is not at all related to the *Cactaceae*, but belongs to the *Amaranth* family, of which our tumble weed is a familiar representative. Its true botanical name is *Salsola kali*, var. *tragus*, D. C., commonly known as saltwort, from the abundance of alkaline salts the plant contains in its tissues.

The seed is a trifle larger than a millet seed, spirally coiled, and is not tenacious of life—cold, wet weather injuring its germinating powers. The plant is an annual, growing each year from the seed, and it is not probable that it will germinate if exposed to the weather after the first year. As the seed sprouts it unfolds its two cotyledons, or seed leaves, which soon acquire a reddish tint. In this stage its growth is slow, it is exceedingly tender, and easily destroyed by cultivation. In a short time the plant strikes a deeper root, throws out a whorl of several elongated, terete, leaf-like branches, from an enlarged base, and now somewhat resembles a seedling pine. The stems become streaked with purple or red—which is also characteristic of the mature plant until killed by the frost at the close of the season. Until the middle of July the plant is smooth and succulent, and is readily eaten by cattle, sheep and hogs—they will often prefer it even where other pasturage is abundant.

About the middle of July the plant becomes more stiff and spiny, and soon throws out numerous small, rose-colored, alternate, sessile flowers, about one-eighth of an inch apart on the stem, in the axils of three spiny leaflets or bracts.

The plant makes a rapid growth in grain fields after harvest, beginning to mature its seeds about the last of August. It is now so stiff and bristly that no animal will willingly pass through it; and when it becomes necessary to use horses in such fields their legs are often booted or wound with cloth to protect them from the irritating effects of the cacti.

The natural habit of the plant is to a lateral more than to a vertical growth, but will vary from slender specimens two inches in height in crowded, unfavorable localities, to thrifty dome-shaped masses six feet in diameter and weighing twenty-five pounds. As soon as the plant is killed by the frosts the root quickly decays, and the plant is broken loose by the winds, rolling along over the prairies for miles, scattering its innumerable seeds along its track.

The plant is supposed to have been introduced into Bon Homme county, South Dakota, about fourteen years ago, in seed grain brought from Russia, by immigrants from the vicinity of the Black Sea; and as the plant is very abundant in that locality it is highly probable that it gained its Northwestern foothold from that source—although a plant, *Salsola kali*, *Linnaeus*, a native of Europe, has long been naturalized along the sea coast of the Eastern United States.

The present geographical distribution of the Russian cactus covers a large portion of the "Jim" River Valley in South Dakota, extending into North Dakota nearly to the Northern Pacific Railroad, and east to the eastern confines of the state. Isolated patches are reported in at least three other states. At present about 4,000 square miles in North Dakota are so thickly infested with the weed

as to become a serious menace to agriculture, and 6,000 square miles more of the state are more or less invaded.

Reliable estimates from the counties infested although somewhat incomplete, as some localities where damage occurred were not reported at the prevailing low prices of farm products, would indicate a direct crop loss of more than one million dollars for the year 1893 alone. The south half of the counties through which the Northern Pacific Railroad passes have sustained no material loss to the crop of 1893. The counties of Dickey, Sargent and LaMoure have suffered most; while southwestern Richland, southwestern Ransom, central McIntosh, and southern Logan are next in line of loss. The crop loss in Dickey county, estimated by the county commissioners, is placed at thirty per cent; Sargent county is estimated at twenty per cent; LaMoure, twenty per cent; McIntosh, twenty per cent; while Richland county reports about 30,000 acres infested with cacti, with a crop loss on this land of fifteen per cent. Much of the land in the worst cacti districts was not plowed last fall because of the mechanical obstruction to machinery presented by the weeds.

From these estimates, which are undoubtedly very conservative, it will be seen that the damage to the crop of 1893 was enormous; and unless the coming season is more favorable to the rapid growth of the wheat plant than the past, the damage will be even greater for 1894.

From information received from different parts of the State, the plant seems to be spreading with great and dangerous rapidity. The rate of invasion of new territory in the open prairie is from twenty-five to thirty miles per year to the north, south and east, and less rapid to the west by reason of our moderate and infrequent eastern winds. Streams with high banks, fences and timber arrest the rolling plants, and to some extent check their rapid spread.

The means adopted for subduing and exterminating the cactus are various, and about as numerous as the individuals devising them. It will suffice to mention only those which have proven, or are likely to prove, successful. Where plants are few and isolated, careful pulling before maturity is effectual; but where they completely cover the ground, excluding every other plant, as they have done in many localities, such a method is impracticable. In such fields burning when dry, either in spring or fall, if well executed, is very effectual. Spring burning is best if the weather is favorable and the ground is dry at the surface, as this destroys all seed blown on the land during the winter. But often the spring is wet, and in the vicinity of plowed fields dirt will be blown into the cacti mixed with snow, which when melted leaves a covering of mud over the seeds which have been scattered over the ground, and when the field is burned the seeds are so protected that they are not destroyed by the heat. This also happens if the ground is very moist in the

spring, independent of drifted dirt. Fall burning has proven more reliable in dense fields.

Burning by means of an iron harrow has been much used, by attaching a team to the harrow by a chain and keeping a continual fire under the harrow as it is dragged along. This has not proven very satisfactory, probably owing to the fact that the scattered seeds were not destroyed, besides many seeds were rattled out by the harrow and fell upon the ground to germinate.

Mowing the stubble, raking, burning and plowing immediately after harvest, before the seeds have matured, is one of the best methods of clearing the ground; but the large areas cultivated, with the pressure of other work at this season, prevents this custom from becoming universal. Millet or other forage crops cut early would allow time for plowing before harvest. Late summer fallowing, from the 10th to the 15th of July, clearing the ground of all plants and harrowing in early spring to insure germination of all seed, will also completely clear the ground. But no matter how thorough the work, rolling plants will be blown over the fields; a portion of the dried blossom adheres to the seed, exposing a larger surface to the wind, and they will blow over the ground drifting along with the snow, completely re-seeding the most carefully prepared fields. In a cubic foot of drifted snow near a field of cacti 32 seeds were found, 30 of which appeared capable of germination.

If all cultivated farms were well fenced, or all plants large enough to roll were yearly destroyed, this great and vexatious problem would be solved. Our native grasses will entirely exterminate the cactus, abundant proof of which can be seen in many once cultivated but now abandoned fields where the cactus has completely disappeared. No native prairie should be broken without first burning off the grass, as the ground is covered with cactus seeds which will be largely destroyed by burning it over.

If fields are to be sown known to be infected with cacti, increasing the amount of seed per acre has been productive of good results; but no more land should be worked than can be well cared for.

Roadsides, railroad embankments, gopher mounds, fire breaks, new breaking, early summer-fallowing, neglected tree claims, and poorly cultivated potato and corn fields produce nearly all the plants which attain sufficient size to roll. A systematic and thorough destruction of these rollers must be enforced; and all stubble or other fields containing smaller cacti should be burned to prevent the detached seed blowing and drifting during the winter. An old picket rope saturated with petroleum, and drawn across the head of the field with a favorable wind, is said to be an effectual method of firing them. When the stubble fields cannot be burned it would be advisable to mow, rake and burn the cacti, reserving the ground for summer fallow or late spring plowing. Plowing under the mature cacti in the fall has often resulted in the complete loss of the follow-

ing crop. It is seldom that the warmth and moisture are sufficient to sprout the seeds after being plowed under in the fall, as the stiff brush of the plant prevents the soil settling together, thereby leaving air spaces which preserve the seeds in good condition to germinate the following spring; and unless such ground is early seeded and the season is extremely favorable the cacti will soon smother out every particle of grain. Late spring plowing, after the cactus seeds have sprouted, has been more satisfactory. Early seeding is advisable, on ground prepared the previous season. All plants attaining sufficient size to break loose and roll before the winds should be destroyed during the month of August, or before the seeds mature.

Organized, systematic effort by counties and townships in every part of the State where this invader has made its appearance, is absolutely necessary; and such efforts will undoubtedly prove successful if properly directed.

The Session Laws of 1891, Chapter 91, Sections 1, 2, 3 and 4, are adequate, clear and explicit in their provisions; and a crisis has now arrived when a judicious and scrupulous enforcement of existing statutes by every county and township board should be regarded as their most imperative executive duty.

Respectfully submitted this 17th day of February, 1894.

M. F. MERCHANT,
Chairman Committee.

In addition to the territory mentioned in the foregoing report, quite a large tract of land is said to be covered by the cactus in McHenry county, near the Mouse river. Southeastern Burleigh is also quite badly affected, and doubtless others.

The law referred to in the last paragraph of the foregoing report is as follows, viz:

NOXIOUS WEEDS.

CHAPTER 91.

PRESCRIBING MANNER OF DESTROYING NOXIOUS WEEDS.

AN ACT for the Destruction of Noxious Weeds, Providing Penalties for the Violation of the Same, and for the Repeal of An Act Entitled "An Act to Prevent the Spread of Noxious Weeds in the Territory of Dakota," General Laws of 1885, Supplement, Dakota Territory, and An Act Entitled "An Act to Amend Section 1, General Laws of 1885, Supplement, Relating to Noxious Weeds, Chapter 102, Session Laws of 1890."

Be it Enacted by the Legislative Assembly of the State of North Dakota:

SECTION 1. NOXIOUS WEEDS DEFINED MANNER OF DESTROYING TO BE PRESCRIBED.] Every person and every corporation shall destroy upon all lands, which any such person or corporation shall own or occupy, all weeds of the kind known as Canada thistle, cockle burr, mustard, wild oats (*Avena fatua*), French weed and Russian cactus (*Salsola kali*, var. *tragus*), at such time and in such manner as shall effectually prevent their bearing seed. Such time and manner of destroying such weeds shall be prescribed by the board of county commissioners, and the same shall be published at least two weeks in some newspaper in the county, not less than two weeks before the time so prescribed; *Provided, further,* That if there be no newspaper published in the county, then written notices of the same shall be posted, the same as election notices are posted in lieu of such publications.

SEC. 2. DECISION TO BE PUBLISHED.] It shall be the duty of the board of county commissioners, at their regular meetings in April of each year, to determine the time and manner of destroying such noxious weeds and shall cause such decision to be published as provided in Section 1 of this act. They shall also cause to be mailed to the chairman of each board of township supervisors and to every overseer of highways and road supervisor in the county a copy of their proceedings.

SEC. 3. WHEN OVERSEERS SHALL DESTROY TAX AGAINST LAND.] Whenever any individual, firm or corporation, owning or occupying any lands within this state, shall neglect or refuse to comply with the provisions of this act for more than ten days after the time prescribed by said board of county commissioners, then it shall be the duty of the overseer or road supervisors, as the case may be, to proceed forthwith to destroy the same in the manner provided for said destruction by the board of county commissioners; it shall also be the duty of such overseers or road supervisors to destroy all such noxious weeds that may grow on the highways and school sections and timber culture claims of his road district, and for so doing such overseer or road supervisor shall have such compensation, payable out of the township treasury or county treasury, as the township board of supervisors or board of county commissioners, upon presentation of his account thereof, verified by his oath and specifying by separate items the charges on each piece of land, describing the same, shall deem reasonable, and the respective accounts so paid, except for the destruction of such weeds upon the highways, shall be placed on the next tax roll of the township or county, as the case may be, in a separate column, headed "For destruction of weeds," as a tax against the said land upon which such weeds were destroyed and be collected as other taxes, and the entry of such tax on the tax roll shall be conclusive evidence of the liability of the land so taxed to such tax.

SEC. 4. PENALTY.] Whenever any overseer of highways or road supervisors shall neglect or refuse to comply with the provisions of this act, after having received notice as provided for in Section 2 of this act, he shall be subject to a fine of fifty (50) dollars, and it is hereby made the duty of the states attorney to enforce the provisions of this act.

SEC. 5. REPEAL.] That an act entitled "An act to prevent the spread of noxious weeds in the Territory of Dakota," General Laws of 1885, Supplement and Chapter 102, Session Laws of 1890, relating to noxious weeds, be and the same is hereby repealed.

SEC. 6. EMERGENCY.] Inasmuch as there is no provision for the destruction of noxious weeds, and many of said weeds will go to seed before July 1st, therefore this act shall take effect and be in force from and after its passage and approval.

Approved March 6, 1891.

NATIONAL AID EXPECTED.

A measure is now pending in the United States Senate which if enacted will make adequate provision for National aid in exterminating this pest, similar to the aid furnished by the General Government in stamping out pleuro-pneumonia among cattle which was recently accomplished. Concerning the proposed law and the weed to be exterminated, the following extracts from a letter by Mr. Frederick V. Coville, Botanist of the Department of Agriculture at Washington, will be read with interest:

A study of this question for the past two years by the Department of Agriculture shows conclusively that the progress of this weed can be stopped only by uniform concerted action during the same season or seasons over the whole infested area. The facts at present in hand show also that the progress of the Russian thistle is rapid, and that if any determined action is to be taken against it it may be done far more economically in the immediate future than after the expiration of a few years. It is undoubtedly true that if the progress of the weed is not stopped the damage caused by it in future years will annually reach \$25,000,000. * * *

After a careful survey of the whole question of exterminating the Russian thistle, I am convinced that by such a law as that already introduced in the Senate, * * * and by an energetic execution of this law by the Department of Agriculture, in co-operation with the State laws and State authorities, the weed would be either exterminated or so nearly blotted out as to be easily managed thereafter by local authorities. * * *

The Russian thistle is peculiar in some respects, especially in the fact that it fails to mature its seed until about the 15th of August in the southern part of its range, and about the 1st of September in the northern part. This, in connection with the fact that it is an

annual, offers a better promise of success in contending with it than is offered by any other of our pernicious weeds. The damage already done by the Russian thistle is without question slight in comparison with the damage which will be done by it if its progress is not soon checked. It is a weed peculiarly adapted to the great wheat-raising portion of the United States, and its advent is ominous of an overwhelming calamity to that region.

Our State law, Chapter 91 above quoted, is fully adequate so far as any State enactment can be, and is, so far as the writer has seen, the best law possessed by any of the States on the subject. All that is needed is to rigidly enforce it in all its provisions; and if the proposed National law is enacted and approved by the President, to cordially co-operate with the General Government in all its efforts to eradicate the weed. While it is not probable that this State alone, or even in co-operation with other states, can exterminate the pest, so long as large tracts of government land, often once cultivated but now abandoned and overgrown with thistle, act as a constant source of supply; our people can nevertheless check the spread of the weed, eradicate it from their own lands, and by constant vigilance keep it confined largely to abandoned or waste lands until such time as National aid may be secured to completely wipe it out of existence. Where a single plant will produce from 10,000 to 15,000 seeds, and often several times that number, it will be readily seen that a few dollars judiciously expended now by every locality will have better effect than hundreds or thousands expended two or three years hence.

DESCRIPTION OF THE PLANT.

At the risk of repeating the matter contained in the report of the Cactus Committee, it is thought best to give the following technical botanical description of the plant, as given by L. H. Dewey, of the Department of Agriculture at Washington, for Bulletin No. 31, lately issued by the Agricultural Experiment Station of Nebraska; this technical description to be followed by a popular one from the same Bulletin—the object being to make its description so clear that the plant will not fail to be recognized, and its destruction thereby better secured. Dr. Dewey's description is as follows:

TECHNICAL DESCRIPTION.

"Salsola kali L. var. tragus D.C. Prod. XIII. 2, 187 (1849).
Herbaceous, annual, diffusely branching from the base, usually densely bushy at maturity, .5 to 1 m. high and twice as broad,

smooth or slightly hispid; root simple, dull white, slightly twisted near the apex; leaves alternate, sessile; of the young plant deciduous, succulent, linear or subterete, 3 to 6 cm. long, spiny-pointed, and with narrow, denticulate, membranaceous margins near the base; leaves of mature plant persistent, each subtending two leaf-like bracts and a flower, at intervals of 2 to 10 mm., rigid, narrowly ovate, often denticulate near the base, spiny-pointed, usually striped with red like the branches, 6 to 10 mm. long; bracts divergent, like the leaves in size and in all respects but position; flowers solitary and sessile, perfect, apetalous, about 10 mm. in diameter; calyx membranaceous, persistent, enclosing the depressed fruit, usually rose colored, gamosepalous, cleft nearly to the base into five unequal divisions about 4 mm. long, the upper one broadest, the two next the subtending leaf next in size and the lateral ones narrow, each with a beak-like, connivent apex, and bearing midway on the back a membranaceous, striate, erose-margined wing about 3 mm. long, the upper and two lower ones much broader than the lateral ones; stamens 5, about equaling the calyx lobes; pistil simple; styles 2, slender, about 1 mm. long; seed 1, obconical, depressed, about 2 mm. in diameter, dull gray or green, exalbuminous, the thin seed coat closely covering the spirally-coiled embryo; embryo about 12 mm. long with 2 terete cotyledons."

POPULAR DESCRIPTION.

More or less spherical in shape, and consisting of many elongated branching twigs which grow outward and upward from the root. When not quite mature the whole plant has a reddish color, but as its seeds ripen it bleaches out and eventually is almost white. Well-grown specimens are from two to three feet in diameter, but where crowded together they may be much less. Each twig and branch is covered on all sides by hard, stout prickles, which are very sharp and very irritating to the touch. These prickles are in threes, that is, there are three together in a place and pointing in different directions. At the upper side of the base of each three prickles there is a seed, and as there are about ten of these to each inch it is easily seen that the seeds produced by every well-grown plant must reach a great many thousands. Late in the fall and in the early part of winter the root breaks off and the plant is free to roll away with its freight of seeds.

The young plant, which appears in May and June, does not suggest to the farmer anything of its final form and harmfulness. It

is then a soft, smooth, and innocent-looking plant, with narrow, fleshy leaves an inch long. It blossoms in July and August, and its seeds mature in September and October.

The seeds are about a twelfth to a sixteenth of an inch in diameter, of a dull-grayish or greenish-gray color. When the thin covering is rubbed off from them they are seen to have a spiral structure.

The report of the Secretary of Agriculture for 1892, page 214, gives the following concerning the plant:

"The Russian thistle grows best on high, dry land. The plants are less numerous and robust in wet than in dry seasons, not because they cannot stand wet weather, but because they are more crowded by other plants. The thistle appears to grow equally well in alkaline and non-alkaline soils. The absence of trees and fences, the strong winds, and the methods of farming followed in the Northwest are particularly favorable to its distribution and growth. Wheat is sowed over acre after acre, sometimes merely drilled in on the furrow, or even on unplowed stubble land. Where whole sections and even townships form one continuous wheat field, an acre here and there so grown up to weeds as not to be worth harvesting, does not seem to be of much importance; but it is in such places that the principal development of thistle seeds for the succeeding year takes place. Plowing in the spring or early summer is especially favorable to the growth of the Russian thistle, since it then obtains a thorough foothold in July, and, being able to stand dry weather better than other plants, takes complete possession of the soil.

The following remedies are recommended: Plow in August or early September, before the weeds have grown large and stiff, and before they have gone to seed. If the season be long and the plants come up through the furrow, it may be necessary to harrow the land before winter. Burn over stubble fields as soon as possible after harvest, and cut the stubble with a mowing machine if the fire does not burn everything clean. If the weeds have been neglected and have grown large and rigid, as they do by the middle of September, especially on neglected barren fallow, they may be raked into windrows and burned. This method is to be recommended only as a final resort, for by the last of September some of the seed will be ripe enough to shell out and will escape being burned with the plants. Barren fallowing does very well if the land is kept barren

by thorough cultivating. It gives but little benefit to the land, however. A much better method is to sow clover, millet, or rye, pasture it and plow it under while green. Corn, potatoes, beets, or any cultivated crop, well taken care of, will in two years rid the land not only of the Russian thistle but of nearly all other weeds. Sheep are very fond of the plant until it becomes too coarse and woody. By pasturing sheep on the young thistle it may be kept down, and the only valuable quality the plant has may be utilized. If the Russian thistle is to be kept out of cultivated fields, it must be exterminated also along the roadsides, railroad grades, fire-breaks, wasteland, wherever the sod has been broken, and in all places where it may obtain an accidental foothold."

SUMMARY OF SUGGESTED REMEDIES.

1. Be careful that you do not sow Russian thistle seed with your crops, and especially look out for flax and millet seed that has been grown in proximity to thistles, as it is liable to contain thistle seeds.

2. Let the people of every locality heartily co-operate to prevent any thistles going to seed, either in their cultivated fields or in waste lands or on the roadsides.

3. Cultivate all land infested with the weed until the first of August, after which time it will not have time to grow and ripen its seeds.

4. If by any means any weeds are allowed to go to seed, pull or cut them carefully, without shattering out the seeds, and then burn them; and then look out for that locality the next year, and promptly pull or cut all weeds that appear.

5. Lands infested with thistles may be pastured with sheep, and the growth thus kept down; but do not depend on the sheep alone, as they will not eat all the weeds, and some will go to seed; but by so pasturing the labor of destroying the weeds may be much reduced.

6. Co-operate fully and cheerfully with the officers of the law in all efforts to suppress this weed.

7. Plowing under the weeds before they become stiff and woody, cutting them with a mowing machine, pulling those in scattered places, carefully burning all that may be found with seed

formed and all other methods of destruction must be called into use.

8. Familiarize all people with the plant, place a sample in every school house, in the business places of the village, labeled, with directions for every plant seen by everybody to be destroyed.

9. A fence will stop the rolling of most of the weeds upon land from the outside. A strip of sunflowers will do the same.

10. Endeavor to put in all small grain in the best condition possible, that the grain may have a good chance to grow and get the start of the thistle; and if unable to put grain in the ground in good condition, it will be better to let the land lie idle and plow in summer so as to kill the thistle.

DUTY OF COUNTY COMMISSIONERS AND TOWNSHIP SUPERVISORS.

Chapter 91 of the Laws of 1891, quoted in full in this pamphlet, gives ample power to these officers to provide for the suppression of this weed and its extermination. Vigorous action is strongly urged, and at once. Do not let disinclination to expend a few dollars this season result in seeding your county or township with this weed, the eradication of which will cost the people many hundreds in future years. All are urgently recommended to proceed as economically as possible—do not waste or unnecessarily expend a penny—but by all means make thorough work of exterminating this weed. Notify all non-residents that they must keep their lands clean, and if they or residents do not do so, see that the work is thoroughly done and the cost taxed against the land. See that the highways and public places are kept clean at public expense.

If the law is passed giving National aid, heartily co-operate with the agents of the Department of Agriculture for the eradication of the pest; but if this bill is not passed by Congress, do not be discouraged and let the matter drop. But do all in your power to prevent thistles from maturing seed on Government land, tree-claims, school sections, etc.

The services of the State Department of Agriculture and Labor may be commanded at any time for any assistance it can render.

NOTE.—Since this was written Prof. Bolley reports that he has received specimens of the plant from Park River, Walsh County, accompanied with the statement that the plant is to be found growing quite plentifully in that region.



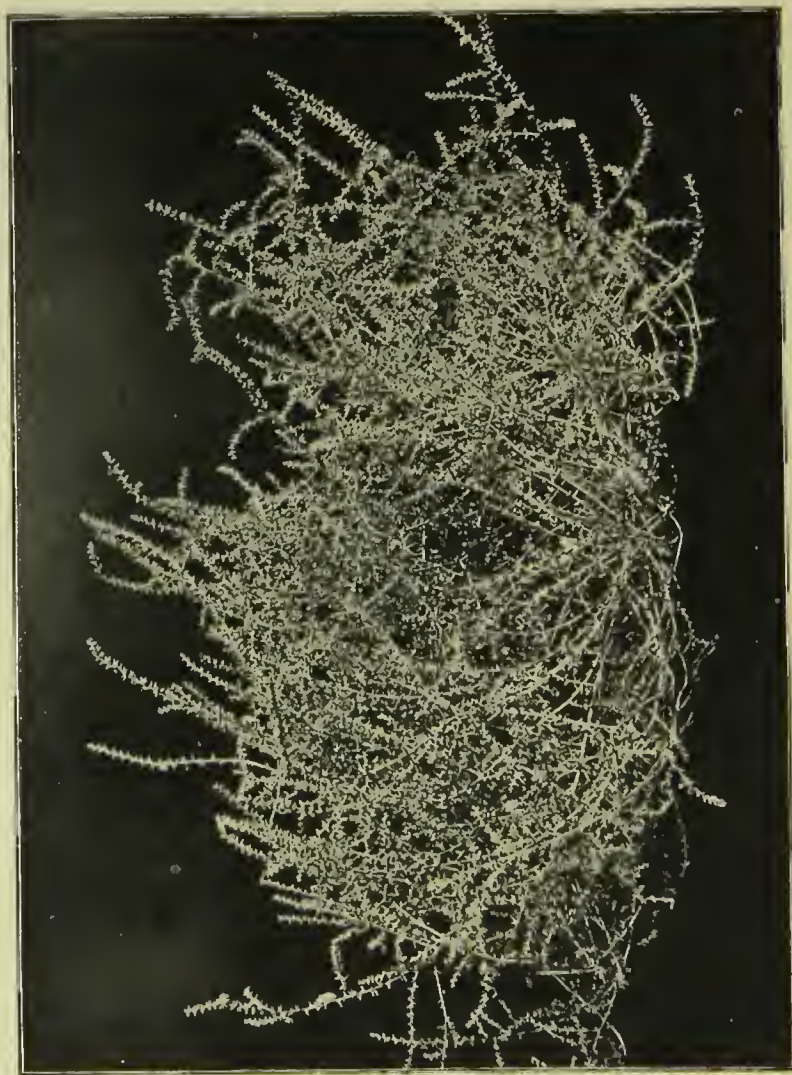


PLATE I.—Represents the full-grown Russian Thistle (*Salsola kali* var. *tragus*), after it has matured in the fall.

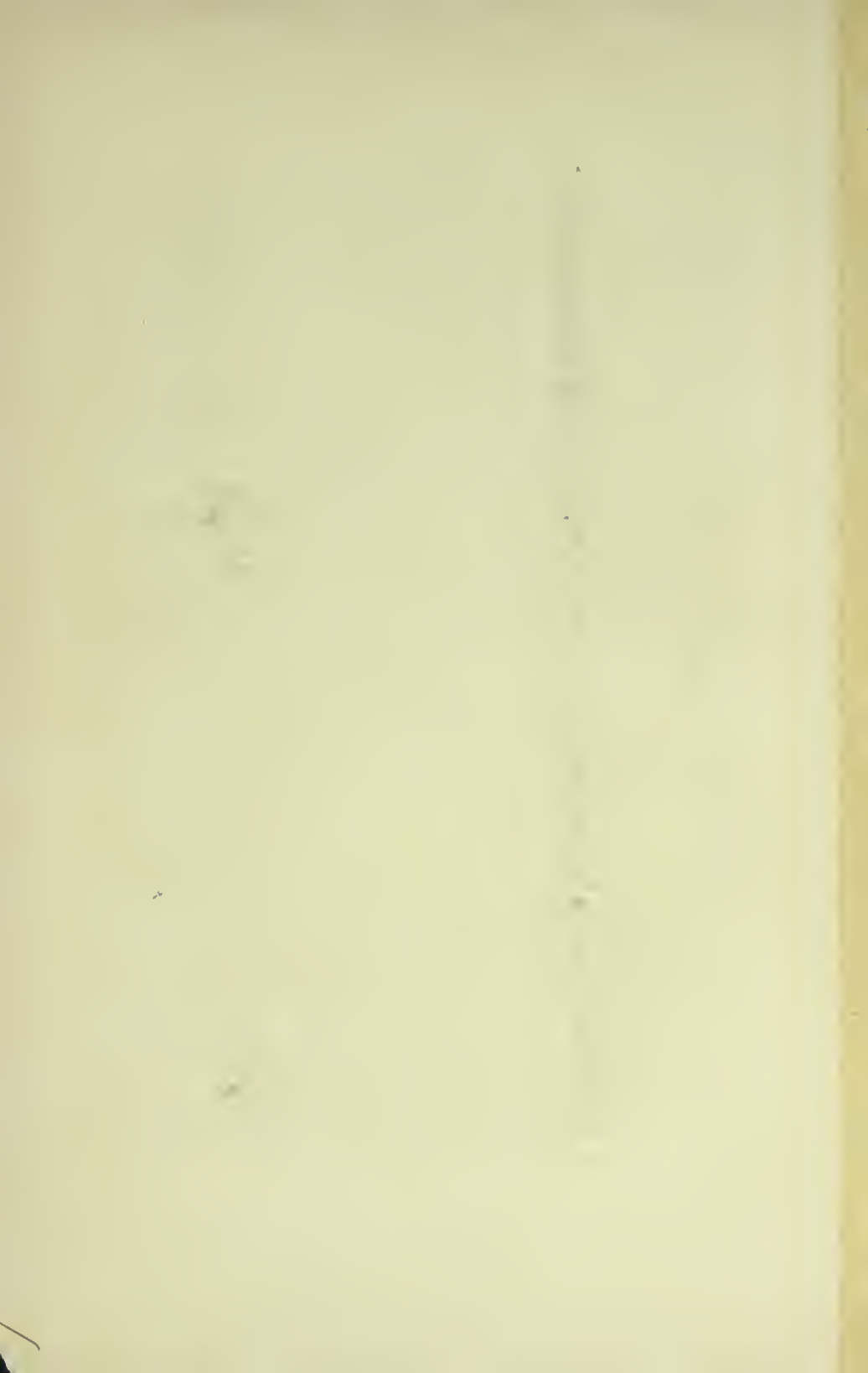




PLATE II.—Represents a branch of the Russian Thistle after maturity.

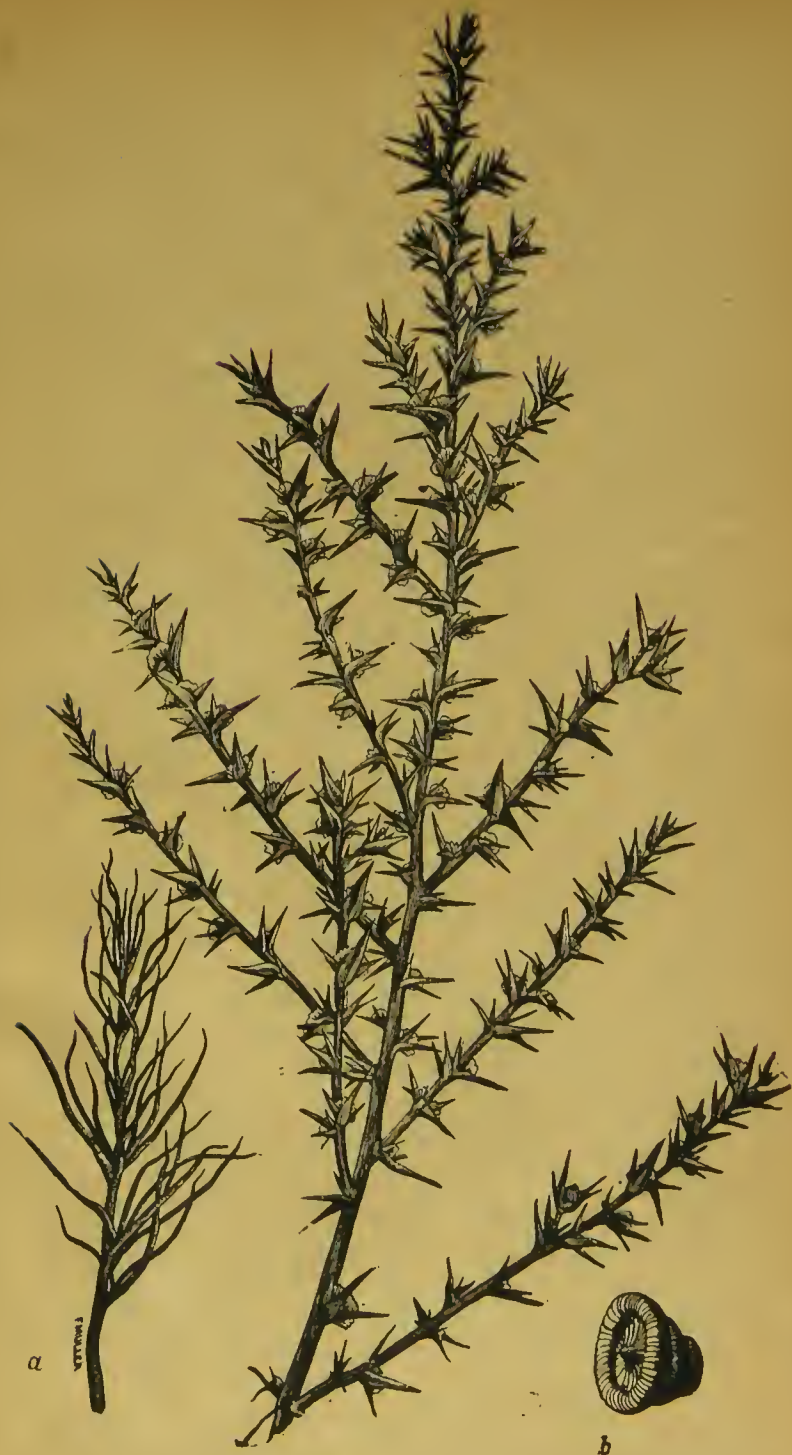


PLATE III.—This represents one of the many branches of the plant as it appears in autumn after maturity. (a) Represents a branch of the young plant, soft and tender. (b) Represents a mature, ripened seed, considerably enlarged





PLATE IV—Represents a branch of the Russian Thistle after it has become nearly grown, but before it becomes stiff, spiny and woody. (a) Represents a section of a branch showing spines which inclose the young flower parts. (b) Represents the coiled embryo or young plant of the seed after the thin covering is rubbed away (c) Represents the blossom. (d) Represents one of the spines, somewhat enlarged in the drawing. (e) One of the petals of the flower enlarged.



